

This listing of claims will replace all prior versions of claims in the application.

Claim 1. (original) A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises a resin that comprises, prior to photoactivation, photoacid-labile moieties that are spaced by at least 1 atom from the resin backbone; and applying ions to the substrate.

Claim 2. (original) A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties in an amount of 12 mole percent or less, based on total units of the resin; and

applying ions to the substrate.

Claim 3. (original) A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties that have multiple covalent linkages to the resin prior to a photoacid-deblocking reaction; and

applying ions to the substrate.

Claim 4. (original) A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises, prior to photoactivation, one or more components that are covalently linked by a group that can be cleaved by exposure and/or photogenerated acid; and

applying ions to the substrate.

Claim 5. (original) A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises, prior to photoactivation, photoacid-labile groups that generate upon photoactivation a cleavage product that comprises 5 or more carbon atoms and/or a single or multiple ring structure; and

applying ions to the substrate.

Claim 6. (original) A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

treating the photoresist composition image thermally or with radiation to remove volatile materials of the photoresist composition; and

applying ions to the substrate.

Claim 7. (original) A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

treating the photoresist composition image to provide a coating thereon; and applying ions to the substrate.

Claim 8. (original) A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises a resin that comprises, prior to photoactivation, photoacid-labile moieties that are spaced by at least 1 atom from the resin backbone; and

the wafer having applied dopant ions.

Claim 9. (original) A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties in an amount of 12 mole percent or less, based on total units of the resin; and

the wafer having applied dopant ions.

Claim 10. (original) A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties that have multiple covalent linkages to the resin prior to a photoacid-deblocking reaction; and

the wafer having applied dopant ions.

Claim 11. (original) A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, one or more components that are covalently linked by a group that can be cleaved by exposure and/or photogenerated acid; and

the wafer having applied dopant ions.

Claim 12. (original) A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, photoacid-labile groups that generate upon photoactivation a cleavage product that comprises 5 or more carbon atoms and/or a single or multiple ring structure; and

the wafer having applied dopant ions.

Claim 13. (original) A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that is coated; and

the wafer having applied dopant ions.

Claim 14. (cancelled)

Claim 15. (currently amended) A chemically-amplified positive-acting photoresist composition that comprises:

i) one or more photoacid generator compounds and

ii) a resin or component chosen from among

a resin that comprises units that contain photoacid-labile moieties in an amount of 8 mole percent or less, based on total units of the resin;

a resin that comprises units that contain photoacid-labile moieties that have multiple

covalent linkages to the resin prior to a photoacid-deblocking reaction;
one or more components that are covalently linked by a group that can be cleaved by
exposure and/or photogenerated acid;
a resin that comprises units that contain photoacid-labile moieties in an amount of 8
mole percent or less, based on total units of the resin; and
a resin that comprises units that contain photoacid-labile moieties that have multiple
covalent linkages to the resin prior to a photoacid-deblocking reaction.

Claims 16-19. (cancelled)